REMARKS

Claims 1-35 were filed in the original application. Claims 17-21 and 26-35 were cancelled without prejudice, and Claims 36-44 were added, in an amendment mailed August 5, 2002. In the Final Office Action of November 10, 2003, the Examiner rejected claims 1-16, 22-25 and 36-44 under 35 U.S.C. 103(a). The rejections are discussed below.

THE CLAIMS ARE NON-OBVIOUS

The Examiner rejects Claims 1-16, 22-25 and 36-44 under 35 U.S.C. 103(a) as being allegedly obvious under WO 99/65602 (hereinafter "McLuen"), in view of WO 98/10857 (hereinafter "Zuckermann").

A *prima facie* case of obviousness requires the Examiner to cite to references that (a) disclose all the elements of the claimed invention, (b) suggest or motivate one of skill in the art to combine or modify those elements to yield the claimed combination, and (c) provide a reasonable expectation of success should the claimed combination be carried out.[1] Failure to establish any one of these three requirements precludes a finding of a *prima facie* case and, without more, entitles Applicants to allowance of the claims at issue.

The Applicants assert that the Examiner has not met the burden of establishing a *prima facie* case of obviousness. In particular, the Applicants reassert that:

1) The McLuen and Zuckermann references, taken together or separately, do not teach all the elements of presently claimed invention; and
2) There is no motivation to combine the Zuckermann reference with the McLuen reference in the manner asserted by the Examiner.

A. The McLuen and Zuckermann References Do Not Teach All The Elements Of The Present Invention

Claims 1-16, 22-25 and 36-44 are rejected under U.S.C. § 103(a) as being unpatentable over McLuen in view of Zuckermann. The Applicants disagree. The combination of the McLuen and Zuckerman references does not teach or suggest all the elements of the claimed invention. The Examiner fails to identify a receiving hole in a cartridge configured to received

[1] See *Northern Telecom Inc. v. Datapoint Corp.*, 15 USPQ2d 1321, 1323 (Fed. Cir. 1990); and *In Re Dow Chemical Co.*, 837 F.2d 469, 5 USPQ2d 1529 (Fed. Cir. 1988).

and hold a DNA synthesis column, where the cartridge is configured to hold an O-ring such that the **O-ring provides a seal between said nucleic acid synthesis columns and said plurality of receiving holes**. The Examiner concedes that the primary reference, McLuen, does not "specifically teach that the cartridge is configured to receive one or more o-rings to provide the seal between the columns and the holes. However, cartridges configured to receive o-rings thereby providing a seal between holes and columns were well known in the art at the time the claimed invention was made as taught by Zuckermann et al." (Final Office Action, page 3). The Applicants disagree and reassert that Zuckermann is also void of this element.

The cartridge of the present invention comprises a plurality of receiving holes configured to hold DNA synthesis columns, where the cartridge is configured to hold an O-ring such that the **O-ring provides a seal between said nucleic acid synthesis columns and said plurality of receiving holes**. Thus, the presence of the O-rings provides a seal **between** the DNA synthesis column and the receiving holes of the cartridge. The Zuckerman reaction vessel, consisting of a container and a valve body, teaches an optional annular sealing means between the elongate conduit portion of the container and valve seat. The annular sealing means thus provides a liquid-tight interface between the conduit and the valve body. (Zuckermann, page 11, lines 22-25). Zuckermann teaches that the array of modular reaction vessels is maintained in linear spaced apart relation to each other within a rack having a plurality of receptacles configured to retain the array of reaction vessels. (Zuckermann, page 13, lines 1-3). As such, Zuckermann describes the use of an annular sealing device **within** a DNA synthesis column or vessel, and **not between** a cartridge and a DNA synthesis column or vessel. The O-ring of the present invention provides a seal between the receiving holes of the cartridge and the DNA synthesis column. Furthermore, Zuckermann does not teach nor suggest a seal between the reaction vessels and the rack configured to retain the array of reaction vessels.

The Applicants reassert Zuckermann and McLuen do not teach a cartridge configured to receive one or more O-rings to provide a seal *between the reaction columns and receiving holes.* The Examiner's inability to cite to references that disclose all the elements of the claimed invention causes Examiner's rejection of claims 1-16, 22-25 and 36-44 to fail.

B. There is No Motivation to Combine the References

No motivation to combine these references to arrive at the claimed invention is provided by the cited references and the Examiner has failed to properly explain why one of ordinary skill in the art, at the time the invention was made, would have been motivated to combine these references.

McLuen provides a polymer chain synthesizer wherein a reaction column vial fits in a cartridge receiving hole. Regarding the actual fit between the reaction column vial and the cartridge receiving hole, McLuen explains that "The exterior of each vial also has a precise dimension around the support. This support fits within the receiving hole within the cartridge and provides a pressure tight seal around each vial within the cartridge." (McLuen, page 12, lines 19-21). McLuen further explains that "Preferably, the receiving holes within the cartridge each have a precise diameter for accepting the vials, which also each have a corresponding precise exterior dimension to provide a pressure-tight seal when the vials are inserted into the receiving holes." (McLuen, page 7, lines 7-10, and page 12, lines 19-21). As such, McLuen *does not identify a problem with forming a seal between the reaction column and the receiving hole of the cartridge that would lead one to modify the device of McLuen.*

The Examiner argues that "It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the cartridge configuration of McLuen *et al.* by configuring the cartridge to receive o-rings between the holes and columns thereby facilitating a tight seal between the holes and columns as taught by Zuckermann *et al.* One of ordinary skill in the art would have been motivated to facilitate the tight seal based on the teaching of McLuen et al wherein a tight seal is desired." (Final Office Action, page 3, citing the quotations provided in the previous paragraph). The Applicants disagree.

McLuen does not teach, suggest, or motivate a person skilled in the art to look beyond its description for ascertaining a seal between the reaction column vial and cartridge receiving hole. In its description of the sealing between the reaction column vial and cartridge receiving hole, McLuen does not state that the provided sealing means is insufficient, nor otherwise imply that alternative means may be considered. Indeed, McLuen states that a proper sealing between the reaction column vial and the cartridge receiving hole is required, and McLuen provides such a sealing means. McLuen does not identify a problem with the provided sealing means, and as

such, McLuen does not suggest or motivate a person skilled in the art to replace its sealing means with that of Zuckermann.

Assuming, *arguendo*, that problems with forming a seal between a reaction column and the receiving hole of the cartridge were perceived and addressed in the McLuen patent, which is not the case, *Zuckerman does not suggest a seal between the reaction column vial and the receiving hole of the cartridge*. The Examiner alleges that "cartridges configured to receive o-rings thereby providing a seal between holes and columns were well known in the art at the time the claimed invention was made as taught by Zuckermann *et al*." (Final Office Action, page 3). The Applicants respectfully disagree.

Respectfully, the Examiner is misinterpreting the Zuckerman reference or misinterpreting the claims of the present invention. The Examiner states that "Zuckerman et al teach a similar cartridge comprising a plurality of receiving holes configured to hold nucleic acid synthesis columns, wherein the cartridge is further configured to receive an o-ring (i.e., annular sealing means) whereby a seal is formed between the holes and columns (page 3, lines 9-29). Furthermore, they teach that the o-ring facilitates sealing between the holes and the column (page 11, lines 19-24)." Final Office Action, page 3. The portions of Zuckerman cited by the Examiner do not teach the use of an O-ring for sealing between the holes of a cartridge and a synthesis column, but rather "a sealing means is provided which encircles the base of the elongate conduit and engages with a matching notch arranged within the valve seat." Zuckermann, page 11, lines 22-24. As such, Zuckermann describes the use of an annular sealing device **within** a vessel, and **not between** a cartridge and a DNA synthesis column or vessel. The sealing means provided in Zuckermann does not involve the cartridge, but rather solely applies to a synthesis column. There is no teaching or suggestion in Zuckermann of a cartridge comprising a plurality of receiving holes configured to hold nucleic acid synthesis columns, wherein the cartridge is further configured to receive an O-ring that forms a seal between the columns and the receiving hole. Thus, Zuckermann does not teach methods relevant to the claimed methods for forming a seal between the receiving hole of a cartridge and the reaction vessel. Therefore, no motivation exists to combine Zuckermann with McLuen.

Thus, Applicants respectfully request that this rejection be withdrawn.

CONCLUSION

For the reasons set forth above, it is respectfully submitted that Applicants' claims as amended should be passed to allowance. Should the Examiner have any questions, or if a telephone conference would aid in the prosecution of the present application, Applicant encourages the Examiner to call the undersigned collect at 608-218-6900.

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